TTP 5000 Kiosk Printers

Technical Specification

SW95005A

SWC
SWECOIN
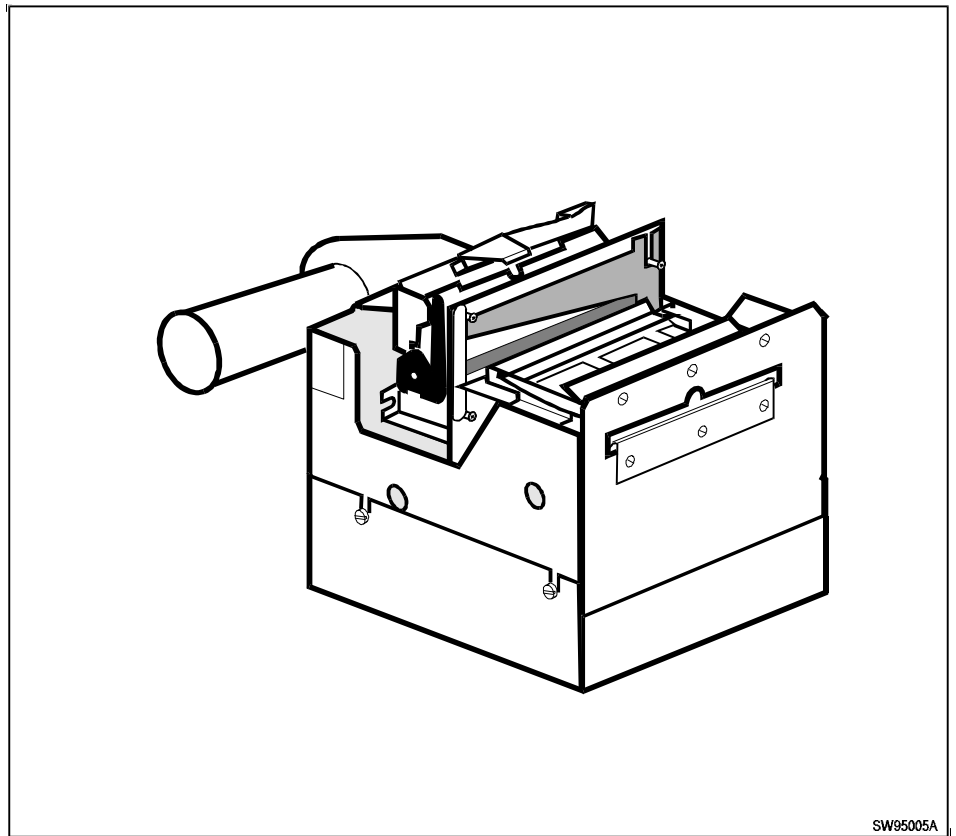
This is a publication of SWECOIN AB
Box 132, S-191 22 Sollentuna, Sweden

Phone   int.+46 8 92 00 80
         nat.   08 92 00 80

Fax   int. +46 8 96 50 54
         nat.   08 96 50 54

BBS   int. +46 8 92 00 88
         nat.   08 92 00 88

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1 INTRODUCTION

The TTP 5000 Series printers are designed primarily for installation as printing devices in public access terminals. Typical applications are vending machines, ticket issuing machines, information terminals and other devices operated by the public. One of the main features the TTP 5000 printer is the presenter module that prevents the document from being exposed to the customer until the whole document is printed and separated.

1.1 TTP 5000 models

This specification describes the standard version of the printer mo dels TTP 5000/60, TTP 5000/80, and TTP 5000/112 where the sub numbers 60, 80 and 112 refer to the paper width.

1.2 Printer design
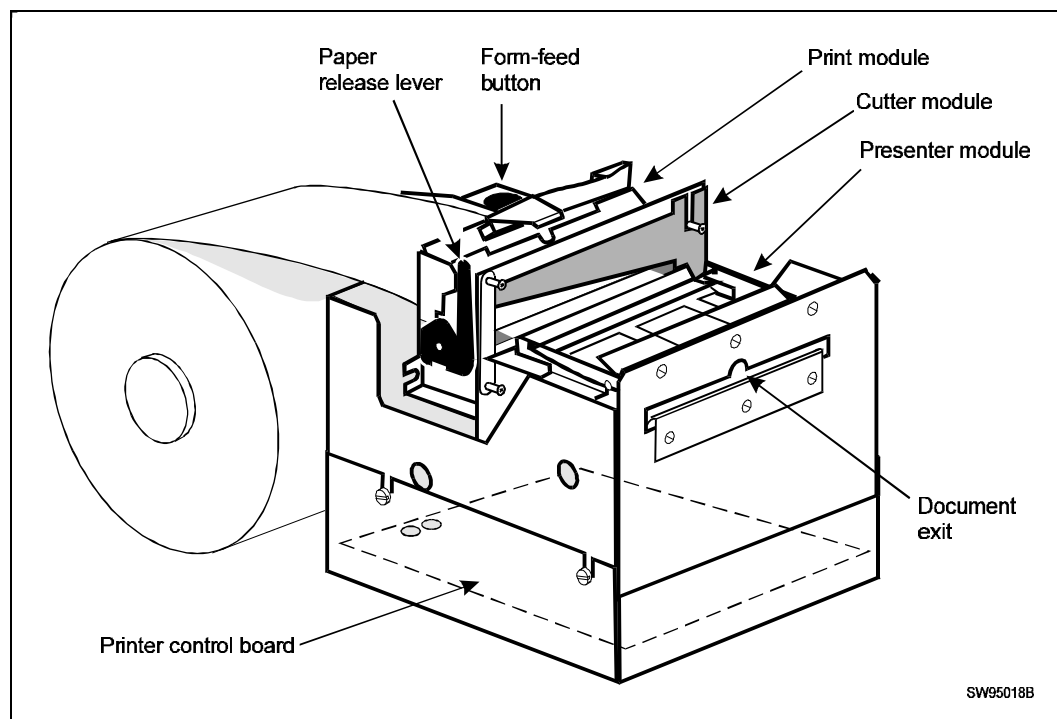
Figure 1. TTP 5000 printer design

The basic printer control board has an RS232 serial interface. A Centronics-type parallel interface can be added as an option in the form of a piggy-back PCB assembly fitted on top of the control board.

Parallel interface,
Centronics-type,
40-pole (optional)

RS 232C serial
interface, 10-pole

SW95070B
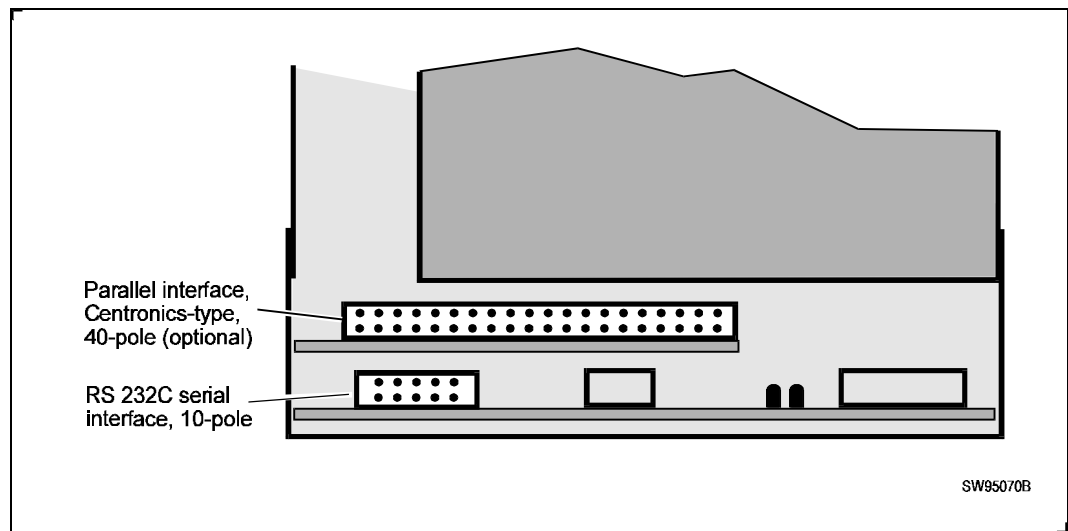
Figure 2. Data communication interface connectors (rear view)

The actions taken by the application software to a large extent depends on the current status of the following sensors in the printer:

Print head temperature	Thermistor in print head (not shown)
Print head lifted position	Microswitch (activated by paper release lever)
Paper end & top-of-form	Reflector sensor
Cutter-home position	Microswitch
Delivery control	Reflector sensor
Paper near end	Reflector sensor, activated when 1—2 m paper remains

Printhead position sensor
Paper release lever
Paper-end & TOF sensor
Paper near end sensor
Delivery control sensor
FRONT
Knife position sensor
SW95079B

Figure 3. Sensors

2 PRINT DATA

Printing method	Direct, parallel, thermal print
Resolution	8 dots/mm (0.125 mm/dot)
Print speed	Approximately 50 mm/s
Paper transport speed	Approximately 50 mm/s
Paper feed accuracy	Step length = 0,125 mm +0/ −1,5%
Print window width	Model -/60 48 mm (384 dots) Model -/80 72 mm (576 dots) Model -/112 104 mm (832 dots)

3 BASIC FUNCTIONS

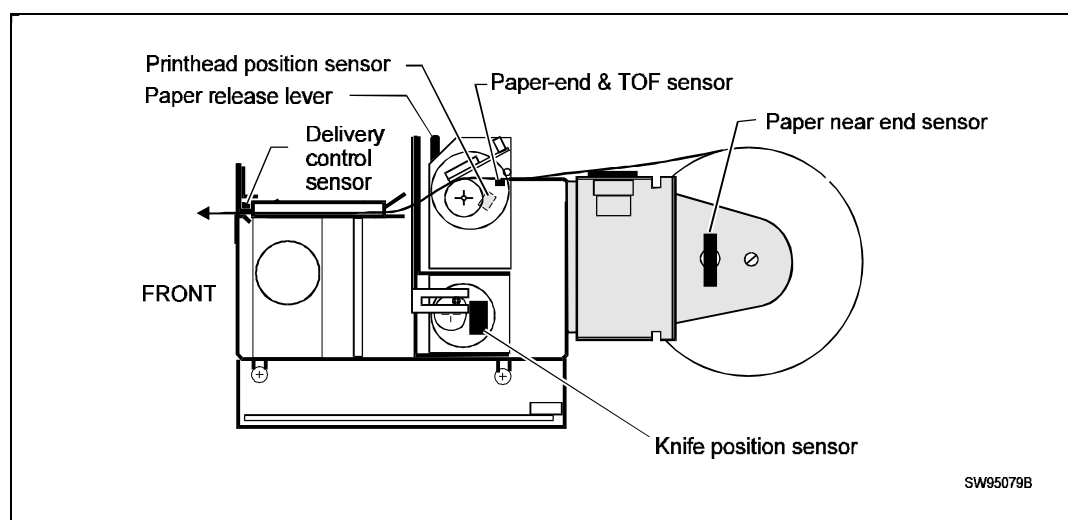|	
Basic character set	IBM Character Set II
National characters	8 national substitute sets
Others	Bar code, EAN8/13, (UPC-A), Code 39, printed in parallel with the paper transport direction.
Page format	Page length can be pre-determined through software command. Page length is the document dimension in the direction of the paper transport. Page width is the width of the paper supply used (60, 80 or 112 mm).
Fonts	Factory installed standard font gives 1 mm wide characters in default mode. Double-height, double-width, quadruple, n x height, n x width, and reversed printing is selectable through software commands.
Graphics	Model -/60 384 dots per line (= 200 dots/inch) Model -/80 576 dots per line (= 200 dots/inch) Model -/112 832 dots per line (= 200 dots/inch)
Print buffer	256 bytes
Software commands	Single-byte commands and ESC sequences (see Chapter 13).
Hex dump mode	Prints data received as hex and ASCII
Test print-out	Includes listing of firmware version and chara cter set.

4 PAPER SPECIFICATION

4.1 General

Paper supply	Roll paper (with or without black marks or punched holes for TOF-detection)
Type of paper	TF50KS-E2C, AF50KS-E, or equivalent is reco mmended
Number of layers	One
Paper color	White. Other colors, not interfering with TOF mark, if applicable.
Paper weight	55—110 g/m²
Paper thickness	0.054—0.10 mm
Surface smoothness	450 s minimum according to Bekk TAPPI T 479
Reflection	85 % minimum according to SCAN P3
Paper end	Must not be glued to the core
Paper cutting	See Figure 4.

4.2 Thermal coating

Thermal coating	Outer side
Sensitivity	Activated at approximately 68 ⁰C, saturated at appr. 75 ⁰C.
Dynamic sensitivity	1.14 ±0.04 OD
Top coating	Standard or UV (if applicable)

4.3 Paper dimensions

Paper width	Model dependent 60, 80 or 112 mm, all widths +0/–0.3 mm
Outer roll diameter	Up to 135 mm
Core inner diameter	25 mm
Paper length	Approximately 220 m (at 135 mm roll diameter, paper thickness dependent)
Core material	Paper or plastic. The paper must not be glued to the core.

4.4 Preprinting

General	Due to the heat developed during printing, any preprint shall meet the requirements applicable for preprinting on paper to be used for laser printing.
	Ink used for pre-printing on the thermal side shall be non abrasive. The ink shall not smear, neither while wound up on the supply roll, nor during the printing process.
	Ink used for preprinting in the TOF-mark zone (see Figure 4) shall not have any influence on the TOF-sensor (OCR blind ink)
Print side	One side or both sides. Printing is not recommended in the TOF-mark zone on the inner side (see Figure 4) unless the above conditions are met.

4.5 Perforation

Perforation	Punching, if applicable, shall be done from outer side (thermo coating side) with a sharp perforation tool.

4.6 TOF detection

Also see Figure 4

General	Black marks or holes can be used to position the paper before cutting. There shall be one mark or hole for each document to be printed. The size and position is given below.
Print side for black marks	Inner side (opposite to thermal coating side)

Black mark printing	Black mark should be printed on inner side of the paper (opposite to thermal coating side). Screen printing is not allowed. Standard wet offset method is recommended. The ink should be optically black. The full mark area must be printed. Measurement of print density (variation within the black mark) shall be performed relative to the white paper background. Using a MacBeth densitometer, the print density shall exceed 1.3. Anti-gloss filter is not allowed. Using a Gretag densitometer, the print density shall exceed 1.5. Reflection from black mark shall be maximum 10 %. Preprinting in the zone passing over the TOF sensor is not recommended. If required, OCR blind type of ink shall be used, (outside the 700—1100 nm range).
Holes	Punching shall be done from the thermo-coating side. Distorted print can be expected within a zone of approximately 2 mm around the edges of the hole. The function shall be tested.
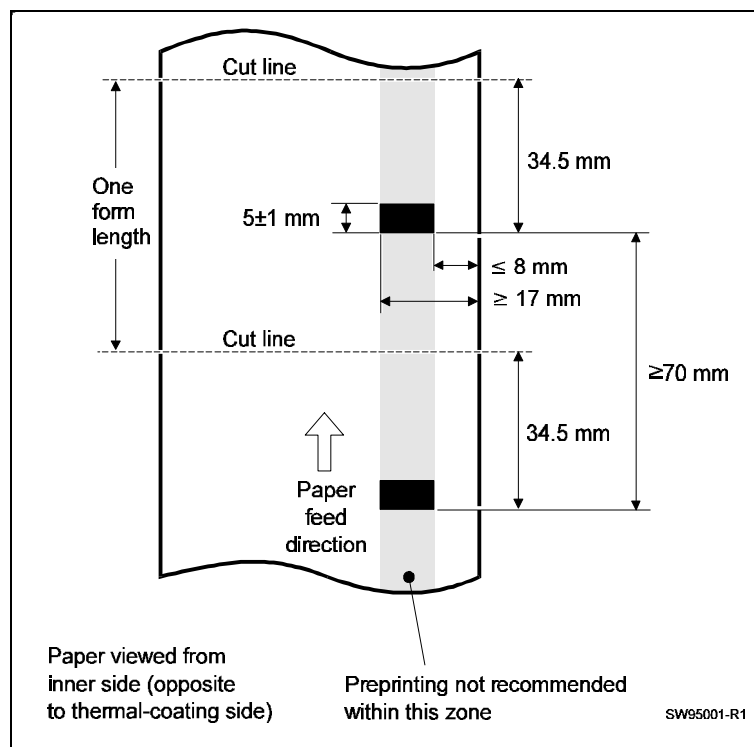
Figure 4. TOF mark

5 PAPER SEPARATION

Cutter	Guillotine-type DC-motor-operated with cam shaft. Home position detection by microswitch.
Cut position	17 mm after print line, 34.5 mm after TOF sensor position (see Figure 4).

6 DOCUMENT PRESENTATION

Presenter module	Controls variable-length documents (70—600 mm) during printing.
	Printing, cutting and feed-out operations can be controlled individually by software commands.
	In combination with a patented loop-building mechanism, the document is retained inside the printer until printing and separation have been completed.
	The paper chute is cleared by software command, for example before start of document printing.
Paper jam detection	The printer features a paper jam detection function which interrupts printing if the presenter sensor does not detect the leading paper edge when expected.

7   DATA COMMUNICATION INTERFACES

Also see Figure 2.

7.1   Serial interface

Interface	RS232C, (V.24)
Data format	8 data bits, 1 start bit, 1 stop bit, odd parity
Transmission speed	9600 baud
Handshaking	Hardware (RTS/CTS) and software (XON/XOFF)
Mating connector	Mating connector for serial interface: AMP type 1-167145-0 or equivalent.
Adapter cable	Serial adapter cable SWC 00602-200 connects the printer to a 9-pole D-sub male connector.

The following table shows alternative ways of designing an interface cable between the printer and a PC. The 9-pole D-sub-connector on the printer side is the connector on the optional serial interface adapter cable SWC00602-200.

Printer			PC		
10-p. ribbon.	**9-p. D-sub**	**Circuit**	**Circuit**	**25-p. D-sub**	**9-p. D-sub**
3	2	RXD	TXD	2	3
5	3	TXD	RXD	3	2
4	7	RTS	CTS	5	8
7	4	DTR	DSR	6	6
9	5	GND	GND	7	5

The printer indicates that it is powered ON by setting DTR high. When initialized, RTS will be set high to indicate to the host computer that it is ready to receive data. RTS will be set low when the buffer is almost full, thereby telling the computer to stop sending data until RTS is pulled high.

The CTS circuit is ignored by the printer and can be left unconnected.

7.2 Parallel interface (optional)

Interface	Centroncs-type
Mating connector	Mating connector for parallel interface: AMP type 4-167144-0 or equivalent
Adapter cable	Parallel interface adapter cable SWC 00601-400 connects the printer to a 36-pole Amphenol male connector.

The following table shows the connector pin assignments.

(The table continues on the next page)

40-pole conn.	Centronics	Signal	Direction	Description
1	1	STROBE	To printer	Strobe signal
2	19	GND		
3	2	D0	To printer	Data bit 0
4	20	GND		
5	3	D1	To printer	Data bit 1
6	21	GND		
7	4	D2	To printer	Data bit 2
8	22	GND		
9	5	D3	To printer	Data bit 3
10	23	GND		
11	6	D4	To printer	Data bit 4
12	24	GND		
13	7	D5	To printer	Data bit 5
14	25	GND		
15	8	D6	To printer	Data bit 6
16	26	GND		
17	9	D7	To printer	Data bit 7
18	27	GND		
19	10	ACK	From printer	Acknowledge signal
20	28	GND		
21	11	BUSY	From printer	Busy signal
22	29	GND		
23	12	Paper out	From printer	Paper out signal

40-pole conn.	Centronics	Signal	Direction	Description
24	30	GND		
25	13	Select	From printer	Selected (on line)
26	31	Init	To printer	Printer initialization
27	14	Autofeed	To printer	Not used in this printer
28	32	ERROR	From printer	Error signal
29	15			Not connected
30	33	GND		
31	16	GND		
32	34			Not connected
33	17	Frame GND		
34	35			Not connected
35	18	+5V	From printer	+5V through 47 kohm
36	36	Select In	To printer	Not used in this printer
37				Not connected
38				Not connected
39				Not connected
40				Not connected

8 POWER REQUREMENTS

The DC power to the printer should be supplied through an external power source.

Power supply units for printer evaluation purposes are available from Swecoin Promakon AB.

24 VDC	Standard text printing: All black printing:	Average 2A, peak 6A, Average 6A, peak 10A.
5 VDC	300 mA	

⚠ CAUTION!

*It is essential that the 5 VDC voltage is established on the printer control board before the 24 VDC drive voltage is brought to the board. Otherwise,**there is a risk of damaging both the PCB and the thermal print head**.*
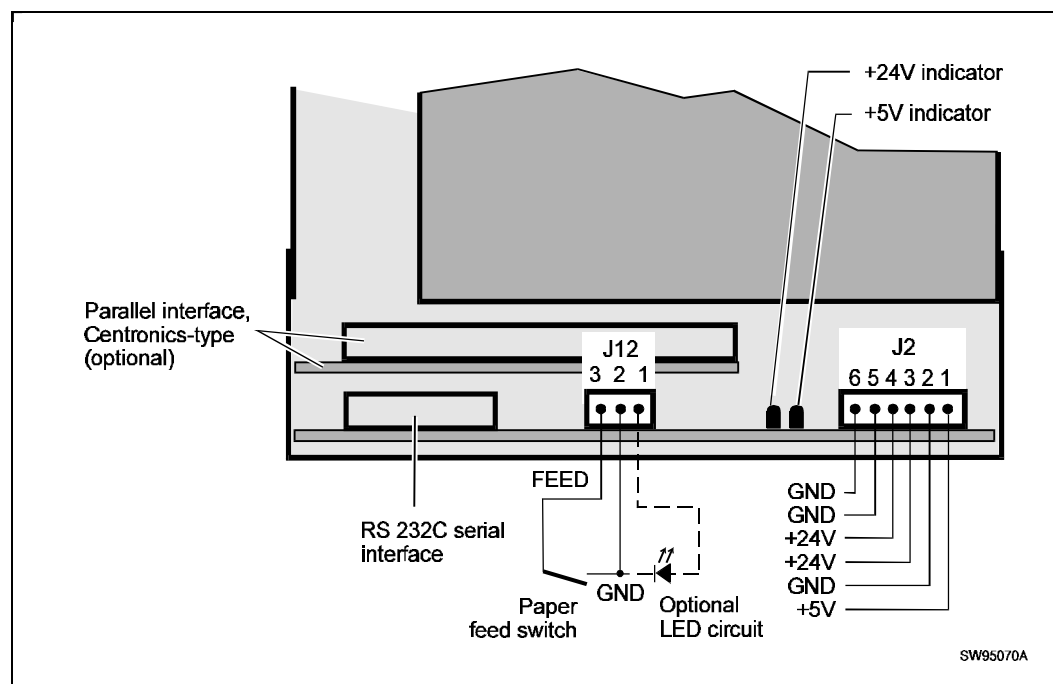

Figure 5. Power supply and paper feed switch interfaces

9 ENVIRONMENTAL CONDITIONS

Temperature	Operation	+5 °C to +45 °C
	Storage	−10 °C to +50 °C (without paper)
	Transportation	−10 °C to +50 °C (without paper)
Relative humidity	Operation	35—75 %, non-condensing
	Storage	10—90 %, non-condensing (without paper)
	Transportation	10—90 %, non-condensing (without paper)
Shock tolerance	Printers packed at factory for shipment can tolerate a drop from 800 mm height without sustaining any damage.	

10 USEFUL LIFE

The information applies for the typical user profile given below.

User profile	Operational 24 hrs x 365 days per year. Average 200 documents per day. Average printing density 20 % of all black
Useful life	7 years approximately

11 MTBF

Printhead	More than 30.000 m of printed paper (including blank lines) or 150 million single-dot lines
Printer control board	40.000 hours typically
Cutter	500.000 cuts typically

12   OPERATOR CONTROLS

Form feed button	Push button that, when kept depressed at printer power on, feeds, cuts and presents a test document. The test documents contain various data such as firmware version, certain parameter settings, etc. Repeated pressing produces successive promotional documents.
Printhead release lever	The printhead is separated from the paper when the lever is in its lower (horizontal) position. This enables the operator to load paper by feeding it through the print module manually. Information about the lever position is included in the status message sent to the host. Printing, cutting, and paper feed is inhibited as long as the printhead is lifted.

13   SOFTWARE COMMANDS

See TTP 5000 Installation Manual for detailed information on each command.

13.1   Character and bit-image mode commands

Command	Hex.	Decimal	Function
LF	0A	10	Line feed
CR	0D	13	Carriage return
FF	0C	12	Form feed
RS	1E	30	Cut and eject paper
SI	0F	15	Reset from double width
SO	0E	14	Set double width print
ENQ	05	5	Clear presenter
CAN	18	24	Clear input buffer
ESC @	1B 40	27 64	Reset, initialize
ESC C n1 n2	1B 43 n1 n2	27 67 n1 n2	Set page length
ESC ENQ 1	1B 05 01	27 5 1	Status inquiry
ESC ENQ 2	1B 05 02	27 5 2	Status inquiry, paper near end
ESC FF n	1B 0C n	27 12 n	Eject only (after cut)
ESC f n	1B 66 n	27 102 n	Presenter motor drive
ESC J n	1B 4A n	27 74 n	Paper advance

Command	Hex.	Decimal	Function
ESC l n	1B 6C n	27 108 n	Line feeds before cut
ESC M n1 n2	1B 4Dn1 n2	27 77 n1 n2	Top-of-form detection
ESC p nnnn	1B 70 nnnn	27 112 nnnn	Custom logotype print
ESC q n	1B 71 n	27 113 n	Burn time adjustment
ESC R n	1B 52 n	27 82 n	Int'l character select
ESC RS	1B 1E	27 30	Cut only, no eject
ESC S n1 n2	1B 53 n1 n2	27 83 n1 n2	Select graphics mode
ESC SI	1B 0F	27 15	Reset from double height
ESC SO	1B 0E	27 14	Set double height print
ESC T n	1B 54 n	27 84 n	Reversed print on/off

13.2 Label- and other top-of-form-oriented commands

Command	Hex.	Decimal	Function
ESC A n1n2n3	1B 41 n1n2n3	27 65 n1n2n3	Set document length
ESC BC b1	1B 42 43 b11	27 66 67 b1	Clear bar code area
ESC BS b1...b11	1B 42 53 b1...b11	27 66 83 b1...b11	Reset bar code block
ESC BW b1..NUL	1B 42 57 b1...00	27 66 87 b1...0	State bar code data
ESC DC d1	1B 44 43 d1	27 68 67 d1	Clear comment area
ESC DS d1...d7	1B 44 53 d1...d7	27 68 83 d1...d7	Reserve comment block
ESC DW d1..NUL	1B 44 57 d1...00	27 68 87 d1...0	Comment block data
ESC E	1B 45	27 69	Clear all label areas
ESC GC g1	1B 47 43 g1	27 71 67 g1	Clear graphics area
ESC GS g1...g8	1B 47 53 g1...g8	27 71 83 g1...g8	Reserve graphics area
ESC GW g1...gn	1B 47 57 g1...gn	27 71 87 g1...gn	Graphics data
ESC LC l1	1B 4C 43 l1	27 76 67 l1	Clear ruler line area
ESC LS l1...l10	1B 4C 43 l1...l10	27 76 83 l1...l10	Ruler line data
ESC P n1	1B 50 n1	27 80 n1	Print document (label)
ESC X n1 n2	1B 58 n1 n2	27 88 n1 n2	Sense top-of-form position
ESC x n1 n2	1B 78 n1 n2	27 120 n1 n2	Set internal top-of-form clock
ESC Y n1 n2	1B 59 n1 n2	27 89 n1 n2	Set start position
ESC Z	1B 5A	27 90	Go to next top-of-form

14 DIMENSIONS

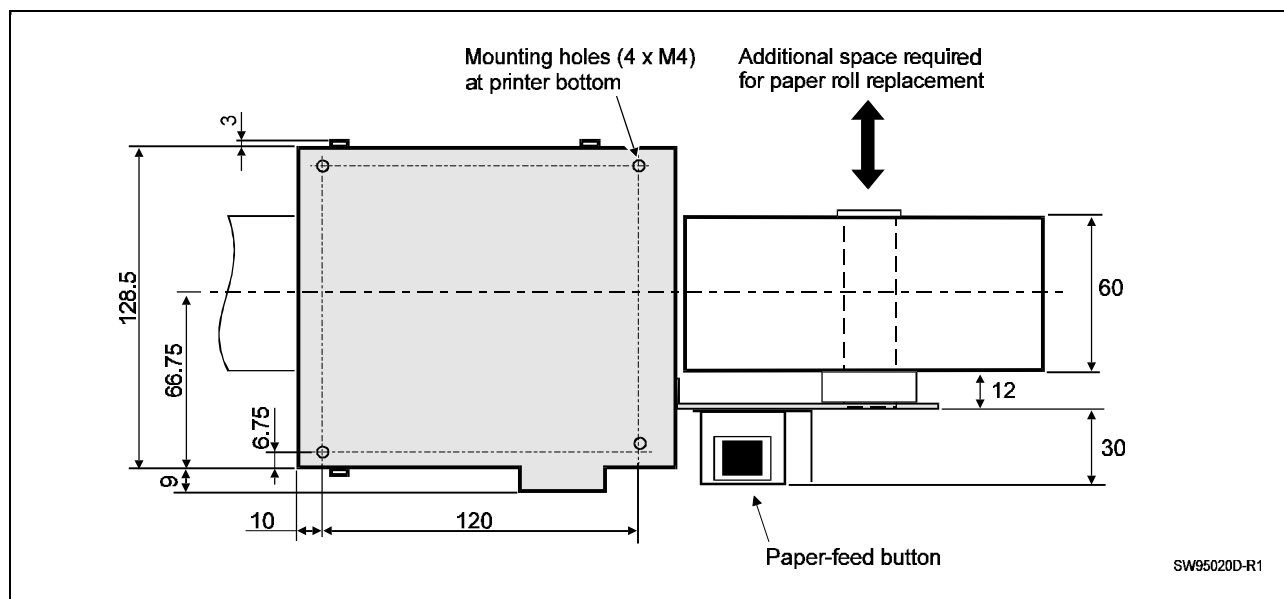The paper roll holder and the paper feed switch can be mounted on the left hand side of the printer if required.
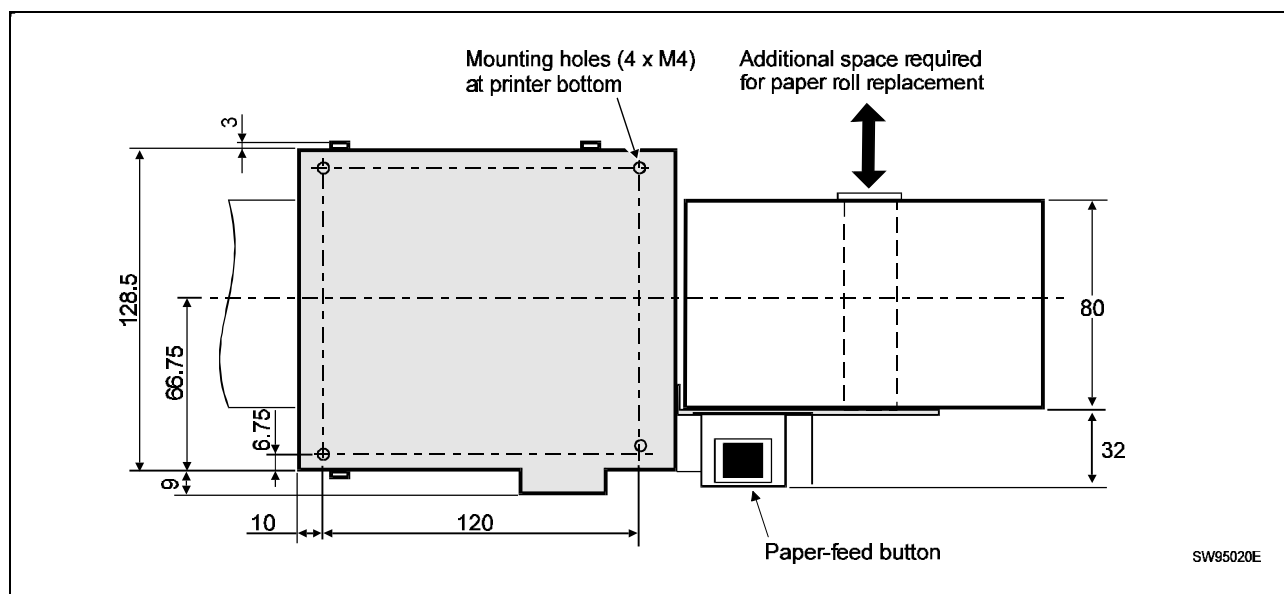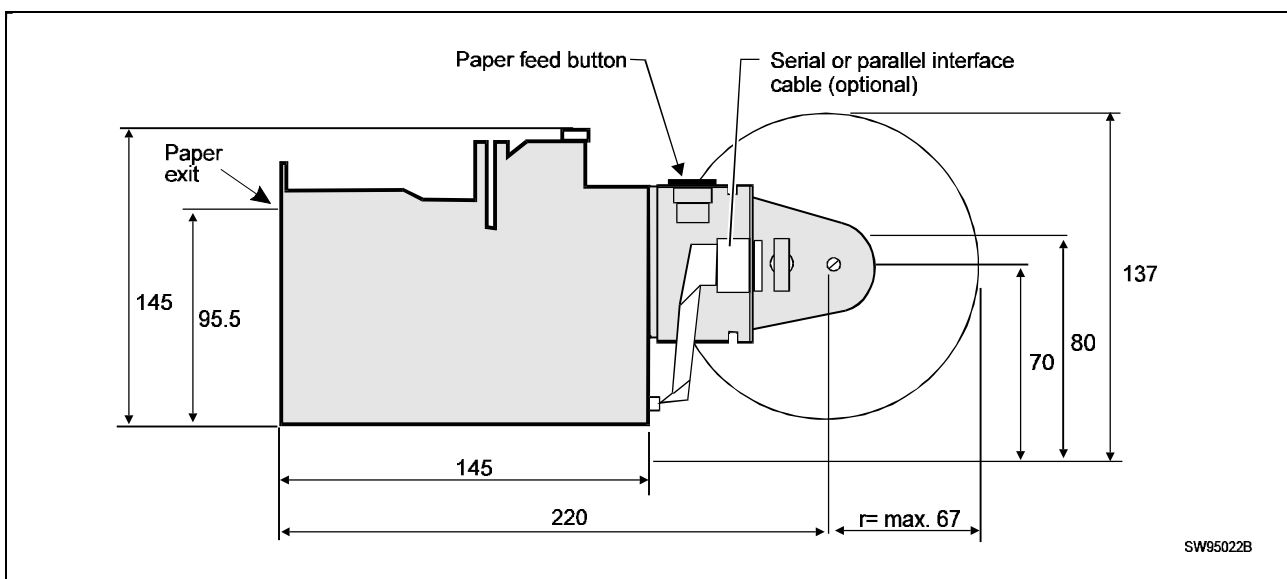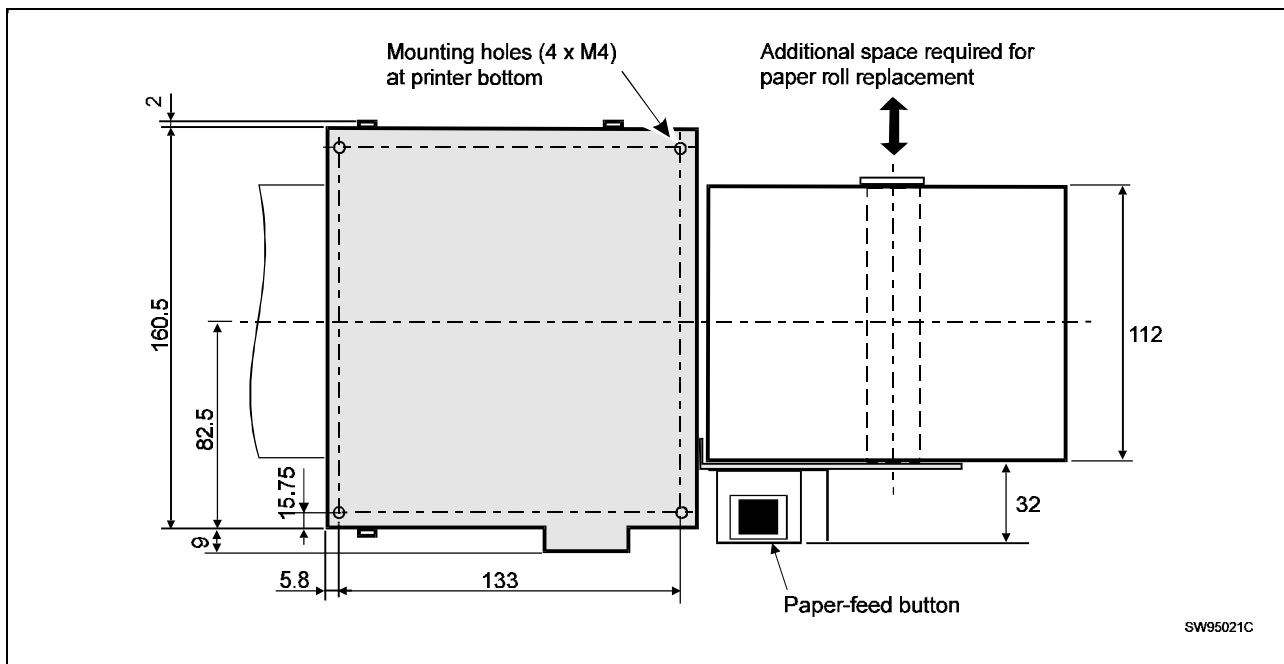

Figure 6. TTP 5000 / 60, top view

Figure 7. TTP 5000 / 80 dimensions, top view

Figure 8. TTP 5000 / 112 dimensions, top view

Figure 9. TTP 5000/60/80/112 dimensions

15 PRODUCT DOCUMENTATION

- TTP 5000 Kiosk Printers, Installation Manual   Part No. SWC-761
- TTP 5000 Kiosk Printers, Service Manual   Part No. SWC-803
- TTP 5000 Kiosk Printers, Operating Instructions   Part No. SWC-809